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Beta - What is Beta (β) in Finance? Guide and Examples

What is Beta in Finance?

The beta (β) of an investment security (i.e. a stock) is a measurement of its volatility of returns relative to the entire market. It is used as a measure of risk and is an integral part of the Capital Asset Pricing Model (CAPM). A company with a higher beta has greater risk and also greater expected returns.

The beta coefficient can be interpreted as follows:

$\beta = 1$ exactly as volatile as the market

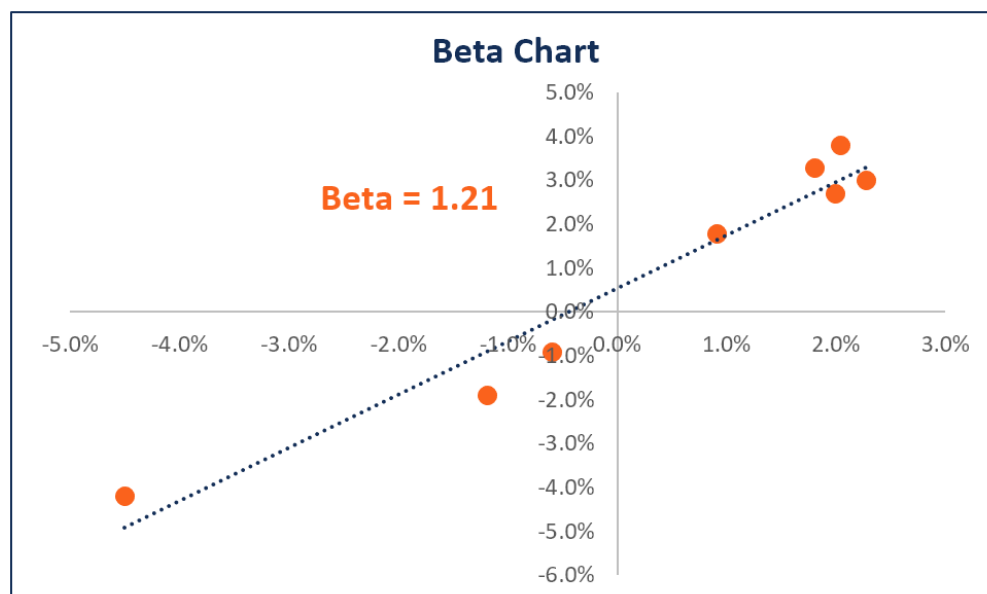
$\beta > 1$ more volatile than the market

$\beta < 1 > 0$ less volatile than the market

$\beta = 0$ uncorrelated to the market

$\beta < 0$ negatively correlated to the market

Here is a chart illustrating the data points from the β calculator (below):



High β – A company with a β that's greater than 1 is more volatile than the market. For example, a high-risk technology company with a β of 1.75 would have returned 175% of what the market returned in a given period (typically measured weekly).

Low β – A company with a β that's lower than 1 is less volatile than the whole market. As an example, consider an electric utility company with a β of 0.45, which would have returned only 45% of what the market returned in a given period.

Negative β – A company with a negative β is negatively correlated to the returns of the market. For example, a gold company with a β of -0.2, which would have returned -2% when the market was up 10%.

Calculation

Below is an Excel β calculator that you can download and use to calculate β on your own. β can easily be calculated in Excel using the Slope function.

Follow these steps to calculate β in Excel:

1. Obtain the weekly prices of the stock
2. Obtain the weekly prices of the market index (i.e. S&P 500 Index)
3. Calculate the weekly returns of the stock
4. Calculate the weekly returns of the market index
5. Use the Slope function and select the weekly returns of the market and the stock, each as their own series
6. Congrats! The output from the Slope function is the β

	Individual Stock			S&P 500 Index		
	Date	Price	Return	Date	Price	Return
4						
5						
6	1/2/2018	15.78		1/2/2018	2,696	
7	1/9/2018	16.38	3.8%	1/9/2018	2,751	2.0%
8	1/16/2018	16.67	1.8%	1/16/2018	2,776	0.9%
9	1/23/2018	17.17	3.0%	1/23/2018	2,839	2.3%
10	1/30/2018	17.02	-0.9%	1/30/2018	2,822	-0.6%
11	2/6/2018	16.31	-4.2%	2/6/2018	2,695	-4.5%
12	2/13/2018	16.00	-1.9%	2/13/2018	2,663	-1.2%
13	2/20/2018	16.43	2.7%	2/20/2018	2,716	2.0%
14	2/27/2018	16.97	3.3%	2/27/2018	2,765	1.8%
15						
16						
17	Beta (β)		1.21			
18						

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Beta Calculator

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Levered Beta vs Unlevered Beta

Levered beta (equity beta) is a measurement that compares the volatility of returns of a company's stock against those of the broader market. In other words, it is a measure of risk and it includes the impact of a company's capital structure and leverage. Equity beta allows investors to assess how sensitive a security might be to macro-market risks. For example, a company with a β of 1.5 denotes returns that are 150% as volatile as the market it is being compared to.

When you look up a company's beta on Bloomberg, the default number you see is levered, and it reflects the debt of that company. Since each company's capital structure is different, an analyst will often want to look at how "risky" the assets of a company are regardless of the percentage of its debt or equity funding.

The higher a company's debt or leverage, the more earnings from the company that are committed to servicing the debt. As a company adds more debt, the uncertainty of the company's future earnings also rises. It increases the risk associated with the company's stock, but it is not a result of the market or industry risk. Therefore, by removing the financial leverage (debt impact), the unlevered beta can capture the risk of the company's assets only.

Calculation of Levered Beta

There are two ways to estimate the levered beta of a stock. The first, and simplest, way is to use the company's historical β or just select the company's beta from Bloomberg. The second, and more popular, way is to make a new estimate for β using public company comparables. To use the comparables approach, the β of comparable companies is taken from Bloomberg and the unlevered beta for each company is calculated.

Levered beta includes both business risk and the risk that comes from taking on debt. However, since different firms have different capital structures, unlevered beta is calculated to remove additional risk from debt in order to view pure business risk. The average of the unlevered betas is then calculated and re-levered based on the capital structure of the company that is being valued.

$$\text{Levered Beta} = \text{Unlevered Beta} * ((1 + (1 - \text{Tax Rate}) * (\text{Debt} / \text{Equity}))$$

Note: In most cases, the firm's current capital structure is used when β is re-levered. However, if there is information that the firm's capital structure might change in the future, then β would be re-levered using the firm's target capital structure.

Interpreting Beta

A security's β should only be used when its high R-squared value is higher than the benchmark. The R-squared value measures the percentage of variation in the share price of a security that can be explained by movements in the benchmark index. For example, a gold ETF will show a low β and R-squared in relation to a benchmark equity index, as gold is negatively correlated with equities.

A β of 1 indicates that the price of a security moves with the market. A β of less than 1 indicates that the security is less volatile than the market as a whole. Similarly, a β of more than 1 indicates that the security is more volatile than the market as a whole. Companies in certain industries tend to achieve a higher β than companies in other industries. For example, the β of most technology companies tends to be higher

For a company with a negative β , it means that it moves in the opposite direction of the market. Theoretically this is possible, however, it is extremely rare to find a stock with a negative β .

Related Readings

CFI is the official global provider of the Financial Modeling and Valuation Analyst (FMVA) certification, a leading program for financial analysts. To continue learning and advancing your career these additional resources will be helpful:

Types of Valuation Multiples

Analysis of Financial Statements

Leverage Ratios

Valuation Methods

Valuation Techniques

Learn the most important valuation techniques in CFI's Business Valuation course!

Step by step instruction on how the professionals on Wall Street value a company.

Learn valuation

the easy way with templates and step by step instruction!

Beta Coefficient



What are Equity Beta and Asset Beta?

Levered beta, also known as equity beta or stock beta, is the volatility of returns for a stock, taking into account the impact of the company's leverage from its capital structure. It compares the volatility (risk) of a levered company to the risk of the market.

Levered beta includes both business risk and the risk that comes from taking on debt. It is also commonly referred to as "equity beta" because it is the volatility of an equity based on its capital structure.

Asset beta, or unlevered beta, on the other hand, only shows the risk of an unlevered company relative to the market. It includes business risk but does not include leverage risk.

